

AMENDMENTS TO THE DRAWINGS

A replacement formal drawing for Fig. 18 has been filed concurrently.

REMARKS

In view of the above amendments and following remarks, reconsideration and further examination are requested.

A replacement formal drawing has been provided for Fig. 18 so as to designate this figure as --Prior Art--.

The specification and abstract have been reviewed and revised to make editorial changes thereto and generally improve the form thereof, and a substitute specification and abstract are provided. No new matter has been added by the substitute specification and abstract.

The instant invention pertains to a component mounting apparatus and a component mounting method. Objects of the present invention are to improve controllability of motion control of constituent sections including the head unit and the component feed unit, and to reduce a developmental period of control of component mounting.

According to the present invention, a "centralized control system" that intensively executes operational control of a plurality of constituent sections by use of one control unit, as is used in a control system of conventional component mounting apparatus, is not adopted. Rather, with the instant invention, each of the constituent sections is individually provided with a distributed control unit, and each operational control is enabled by transmitting and receiving a timing signal between the distributed control units, not through a main control unit, while being correlated with one another.

Therefore, functions or control software provided for the main control unit can be reduced, and the functions and the control software borne by the aforementioned conventional control unit can be distributionally provided by distributed control units including a head unit control section and a component feed unit control section. Thus, if recipes and timing signals, which can be pseudo-formable even without actual constituent sections, are prepared (that is the recipes and the timing signals are prepared hypothetically) in an apparatus developmental stage, functions and control performances can be confirmed at an early stage in the distributed control

units, and a developmental period can be markedly shortened as compared with the conventional centralized control system.

Additionally, by shortening the developmental period of the mounting apparatus, it becomes possible to provide an apparatus that meets various needs of users of the mounting apparatus in a short time, thereby taking advantage of this shortened period. Moreover, it is possible to obtain a period for sufficiently providing controllability, and therefore provide a mounting apparatus whose control accuracy is improved. Furthermore, by making the distributed control units distributionally bear advanced complicated control required for the mounting apparatus without concentrating control processing on one portion, a processing speed can be improved and controllability can be made satisfactory.

New independent claim 53 is representative of the inventive apparatus, and new independent claim 72 is representative of the inventive method.

Claims 28-36 and 40-52 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Asai '292 (Asai) in view of Asai et al. '277 (Asai2). And, claims 37-39 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Asai in view of Asai2, and further in view of Ijuin. These rejections are respectfully traversed, and the relied-upon references are not applicable with regard to the newly added claims for the following reasons.

Initially, please note that new claims 53 and 72 basically correspond to former claims 28 and 46, respectively, and accordingly, the prior art rejections will be addressed as they pertain to these new claims.

In supporting the rejection of the claims, the Examiner recognizes that Asai does not explicitly teach that the head unit control section is operable to transmit a timing signal to the component feed unit control section based on the execution of the component holding and pickup operation, and that Asai also does not teach that the component feed unit control section is operable to complete the component feed operation on the basis of a transmitted recipe and timing signal. Thus, the Examiner relied upon Asai2 to resolve this deficiency; however, Asai2 does not remedy these deficiencies of Asai.

In this regard, there is no disclosure in Asai2 about transmitting and receiving a timing signal between distributed control units, and not through a main control unit. Specifically, Asai2 discloses a conventional "centralized control system", over which the instant invention is an improvement. That is, in column 55, line 62 through column 56, line 31, it is stated that the CC mounting system 8 includes a control device 1050 that is provided by a computer 1052, which computer includes a CPU, ROM, RAM. To the computer 1052 are connected the sensors, cylinders, and motors. Accordingly, in Asai2, the control device 1050 has only one control unit (computer 1052), and Asai2 is silent with regard to distributed control units. This is clear from Fig. 24 of Asai2.

Additionally, the time chart in Fig. 25 represents only a timing relationship among X-Y robot 662 and feeder 54, and there is no description in column 61, line 1 through column 62, line 4 as to how timing relations are created. However, considering the centralized control system employed in Asai2, such timing relations must be created in the computer 1052 corresponding to the main control unit. Thus, there is no disclosure in Asai2 of transmitting and receiving a timing signal between distributed control units, as required by each of independent claims 53 and 72.

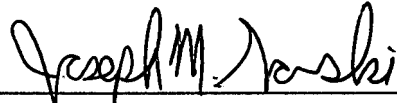
Ijuin does not resolve this deficiency, and accordingly, claims 53 and 72 are not obvious over any possible combination of the relied-upon references, whereby claims 53-77 are allowable.

In view of the above amendments and remarks, it is respectfully submitted that the present application is in condition for allowance and an early Notice of Allowance is earnestly solicited.

If after reviewing this Amendment, the Examiner believes that any issues remain which must be resolved before the application can be passed to issue, the Examiner is invited to contact the Applicants' undersigned representative by telephone to resolve such issues.

Respectfully submitted,

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